SPECIFICATION

TITLE OF THE INVENTION

ANTENNA AND ACCESS POINT MOUNTING SYSTEM AND METHOD

BACKGROUND OF THE INVENTION

(1) 1. Field of the Invention: The present invention relates, in general, to an antenna and access point mounting system and method for mounting an access point above a ceiling or on a wall surface of a building, and in particular, to such a system and method that includes a cover for protecting the antenna and supporting the antenna coaxial cables, and a freely movably mounting base plate for allowing the coverage area of the access point to be easily fine-tuned.

(2) 2. Background Art: With the advent of wireless LAN (local area networks) communication systems operating in the 2.4GHz (gigahertz) range, which have been developed for both outdoor use, as well as indoor use in homes, office buildings and industrial complexes, the need for easily installed unitized antennas and access points has increased. In the 2.4GHz range, coaxial cable length becomes a factor as the longer the coaxial cable becomes, the more signal loss incurred. While the individual antenna technology and the individual access point technology exist, the need for antenna and access point mounting systems remain.

(3) The typical installation of wireless LAN 2.4GHz GSM (Global System for Mobile Communications) access point transceivers involves the placement of the access point and its antenna in an area to give the desired radio frequency coverage in the specific area. Many aftermarket antennas require separate mounting with longer coaxial cable

runs and no firmly established mounting methodologies exit.

(4) The ambiguity of mounting and installation methodologies results in radio frequency coverage less than desired or less than specified system parameters.

(5) Some antenna designs are inherently fragile and in order to minimize the possibility of damage, a protective cover is installed over the antenna. This cover protects the antenna coaxial cables from lateral stress and shock that could cause antenna circuit board failure.

(6) In the past, access points and their antennas were mounted in fixed locations and did not lend themselves to relocation in order to fine-tune an area of coverage.

(7) Today, there are antenna technologies that embed antennas into or onto ceiling tiles. While this is certainly one method of attachment, the first is difficult, if not impossible to match ceiling tiles to a building or structure that has been erected and occupied for some time. Ceiling tiles discolor and cannot be matched. Furthermore, they are difficult to remove and relocate to another location for the purpose of fine-tuning a coverage area. The solution of penetrating the ceiling tile and mounting the antenna to the outside of the ceiling tile is another workable solution, but is time consuming, and messy especially if done at the customer location and again does not lend itself to easy relocation.

(8) In a typical wireless LAN configuration, a transmitter/receiver (transceiver) device, called an access point or access point transceiver, connects to a wired network from a fixed location using standard input cabling. The access point receives, temporary stores, and then transmits data between the wireless LAN and the wired network infrastructure. The access point (or the antenna attached to the access point) is usually mounted high, but may be mounted essentially anywhere that is practical as long as the desired area of

coverage is obtained.

(9) A preliminary patentability search conducted in class 343, subclasses 713, 773, 890, 878, and 720 produced the following patents which appear to be relevant to the present invention: Hightower et al., U.S. Patent 5,276,277, issued January 4, 1994; Hightower et al., U.S. Patent 5,496,966, issued March 5, 1996; Mailandt et al., U.S. Patent 5,619,217, issued April 8, 1997; Canora et al., U.S. Patent 5,777,583, issued July 7, 1998; Gietema et al., U.S. Patent 6,222,503, issued April 24, 2001; Bateman et al., U.S. Patent 6,307,525, issued October 23, 2001; and Stickland et al., U.S. Patent 6,369,766, issued April 9, 2002.

(10) Nothing in the known prior art, either singly or in combination, discloses or suggests the present invention.

BRIEF SUMMARY OF THE INVENTION

(11) In accordance with the present invention, an improved antenna/access point transceiver mounting system and method for installation above ceilings or on surface walls of a building is provided. The antenna/access point transceiver mounting assembly includes a base plate and a cover for the protection of the radio frequency antenna and antenna coaxial cable assemblies which are enclosed in a cavity provided by the cover. The antenna cable assemblies are terminated with the appropriate connectors for connecting the antenna assembly to the access point transceiver. The base plate has a plurality of openings by which various access points are mounted and/or wall brackets are attached.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

(12) Fig. 1 is a top plan view of the mounting system of the present invention.

(13) Fig. 2 is a side elevational view of Fig. 1.

(14) Fig. 3 is an end elevational view of Fig. 1.

(15) Fig. 4 is a side elevational view of the mounting system of the present invention combined with an access point transceiver and antenna of a wireless local area network communication system and placed on top of a suspended ceiling.

(16) Fig. 5 is a sectional view substantially as taken on line 5-5 of Fig. 4.

(17) Fig. 6 is a side elevational view of the mounting system of the present invention combined with an access point transceiver and antenna of a wireless local area network communication system and placed on a wall mounting bracket.

DETAILED DESCRIPTION OF THE INVENTION

(18) The mounting system of the present invention is shown in Figs. 1-6, and identified by the numeral **11**. The method and mounting system **11** of the present invention are used for mounting and fine-tuning the coverage area of an access point transceiver (access point) **13** of a wireless local area network communication system **15** on a support surface **17** such as the top of a suspended ceiling, etc. The wireless local area network communication system **15** may be of any typical configuration, having coaxial input cabling **19**, etc.

(19) The access point **13** may be of various well known types and models desired by the user such as, for example, a Cisco model Aironet 1200 Series access point transmitter by Cisco Systems, Inc.,170 West Tasman Dr., San Jose, CA 95134.

(20) The antenna **21** may also be of various well known types and models desired by the user such as, for example, a 3dpi peak gain, diversity, stipline antenna, model Microsphere CAF94165101 by Centurion Wireless Technologies, Inc., 3425 North 44th Street, Lincoln, NE 68501. The antenna **21** typically includes antenna coaxial cabling **23** for connection to the access point **13**. The antenna coaxial cabling **23** may be reduced in length and terminated with appropriate coaxial cable connectors **25** for connection to the access point **13**. Any protective cover or radome provided with the antenna **21** is removed and discarded.

(21) The mounting system **11** includes a freely movably board member **27** having a top surface **29** and a bottom surface **31**. The board member **27** is preferably radio wave transparent. The phrase "radio wave transparent" is used herein to mean or refer to a material that does not block radio waves. Thus, the board member **27** is preferably constructed out of a plastic bearing substrate such as ABS (acrylonitrile butadiene styrene) or PVC (polyvinyl chloride), or a flourocarbon resin such as Teflon®. The specific shape and size of the board member **27** may vary, but typically consist of a plate-like rectangle having planar and parallel top and bottom surfaces **29**, **31**, with a length of 18 inches (45.72 centimeters), a width of 9 inches (22.86 centimeters), and a height of 0.25 inches (0.635 centimeters). The top surface **29** of the board member **27** preferably has a first area **33** for receiving the antenna **21** and a second area **35** for receiving the access point **13**. The board member **27** preferably has a plurality of openings or apertures **37** through the first area **33** for allowing the antenna **21** to be secured thereto using machine screws **39** and machine nuts **41** or the like. The board member **27** preferably has a plurality of openings or apertures **43** through the second area **35** for allowing the access point **13** to be secured thereto using machine screws or

the like. The apertures **37**, **43** may have a diameter of 0.125 inch (0.3175 centimeters).

(22) The mounting system **11** includes a protective cover **45** for the antenna **21**. The protective cover **45** is mounted to the top surface **29** of the board member **27** over the antenna **21**. The protective cover **45**, or radome, may be formed of a plastic material, such as ABS or PVC, in a general bowl or trough shape, with a wall thickness of about 0.068 inches (0.17272 centimeters), and secured, open face down, on the top surface **29** of the board member **27**, over the antenna **21**, with adhesive or the like. The protective cover **45** and top surface **29** of the board member **27** coact to define an internal space or cavity **47** of sufficient size to house the internal elements of the antenna **21**, including any radio frequency elements, etc. The top of the protective cover **45** may have one or more apertures **49** for allowing the antenna coaxial cabling **23** to extend therethrough.

(23) The method for mounting and fine-tuning the coverage area of the access point **13** on the support surface **17** includes the steps of: providing the access point **13**; providing the antenna **21**; providing the freely movably board member **27**; mounting the access point **13** to the top surface **29** of the board member **27**; mounting the antenna **21** to the top surface **29** of the board member **27**; providing the protective cover **45**; mounting the protective cover **45** to the top surface **29** of the board member **27** over the antenna **21**; providing the antenna coaxial cabling **23**; connecting the antenna **21** to the access point **13** with the antenna coaxial cabling **23** and with the antenna coaxial cabling **23** extending through the protective cover **45**; placing the board member **27** on the support surface **17**; connecting the access point **13** to the coaxial input cabling **19** of the wireless local area network communication system **15**; and then moving the board member **27** on the support surface **17** to fine-tune the area of coverage of the access point **13**. As clearly shown in Figs. 4 and 5, the support surface **17** may be the top of a

suspended ceiling tile **51** or the like. Alternatively, as shown in Fig. 6, the support surface **17** may be wall brackets **53** attached to a wall **55** or the like.

(24) Although the present invention has been described and illustrated with respect to a preferred embodiment and a preferred use therefor, it is not to be so limited since modifications and changes can be made therein which are within the full intended scope of the invention.